SUSY and Higgs

(Michelangelo Mangano, CERN TH)

Executive summary:

- Rather quiet edition for Higgs and SUSY
- LEP output is fading away, Tevatron run 2 has still to ramp up
- No significant issues expected for the forthcoming ‘05-06 edition

Supersymmetry

Encoders: L.Pape (CERN EP), K.Olive (U.Minnesota)

New measurements encoded: 129 (160 in 02; 204 in 00; 114 in 98)

- LEP: 81 (120; 174)
- Tevatron: 13 (22; 20)
- Theory: 20 (13; 6) (of which 11 under "Cosmology χ^0 limits")
- DM searches: 9
- Other exp's: 6 (5; 4)

Minireviews:

- Supersymmetry part I: Theory (H.Haber, UCSC)
- Supersymmetry part II: Experiments (M. Schmitt, NWU)
- **Light gluinos (H. Murayama, UCB) removed**

Detailed breakdown

χ^0 direct	2 (2)	$\chi^{\pm}$ long lived	1 (1)		
$\sigma_{el}(\chi^0 p)$ spin-dep	**3**	sneutrino	7 (14)	**sbottom**	**14 (8)**
$\sigma_{el}(\chi^0 p)$ spin-indep	**7**	selectron	8 (9)	stop	20 (11)
χ^0 dark matter	0 (1)	smuon	6 (8)	gluino	4 (8)
χ^0 cosmology	14 (9)	stau	7 (13)	**light gluino**	**5 (1)**
χ^0 unstable	6 (12)	degenerate slepton	1 (8)	gravitino	2 (3)
$\chi^0_{2,3,4}$	0 (10)	long-lived slepton	0 (1)	misc	1 (3)
$\chi^{\pm}$ unstable	9 (12)	squarks	12 (26)		

Comments:

- Reduction in number of entries continues: LEP fading out, no run II results as yet
- 2 new Sections ($\sigma_{el}(\chi^0 p)$ spin-dep and spin-indep)
- Particular interest in light/stable gluinos and on light sbottom (theory papers, experimental limits):
  - m(sbottom)<m(b) window practically closed (will be closed in '05 web update)
  - m(gluino)>6.3GeV from $\Gamma_{had}(Z)$
  - m(gluino)>26.9 for long-lived gluino (LEP)
- Analyses becoming more and more complicated, emphasis on non-minimal SUSY models (GMSB, RPV, light gravitinos, etc). Encoding is becoming particularly painful, with footnotes' size growing.

Prospects/issues

- Still a few papers from LEP coming out (global constraints in MSSM, RPV limits). Some over 100 page long!
- Reduced hopes of global combined limits from the 4 collaborations, due to lack of manpower
- Tevatron run 2 analysis expected for end-05 => possibly new gluino/squark/GMSB limits for RPP06
- Limits on new models (AMSB, split SUSY, etc) may require additional flexibility in the listings
- Ability to include plots in the listings still strongly needed (but may create more problems that it solves!)

Higgs

Encoder: K. Hikasa (KEK)

New measurements encoded: 25 (42 in 02; 48 in 00; 49 in 98)

- LEP: 21 (36; 39)
- Tevatron: 1 (5; 3)
- Theory: 3 (1; 6)

Minireview:

- *Searches for Higgs bosons* (P.Igo-Kemenes, CERN EP):
- Update of 2002 edition ,with new Section on CPviolating Higgs searches
- More details and LEP WG notes from (persistent) Web page maintained by the author
- Updated until last possible moment before book production

Detailed breakdown

H^0 direct	3 (10)	H^0 extended	8 (11)
H^0 EW corrections	1 (1)	$H^{\pm}$	4 (8)
h^0/A^0 SUSY	7 (12)	$H^{\pm\pm}$	2 (0)

Comments/Prospects

- Included final results of LEP H WG
- Indirect constraints form EW fits (LEP EWWG) quoted in the section header, waiting for the publication
- More results form LEP still coming out:
  - extended Higgs models (doubly charged H, ~CP violating Higgs, fermiophobic H, etc)
- New results form Tevatron run I ready for inclusion in ‘05 web update, results form run 2 likely ready for RPP06